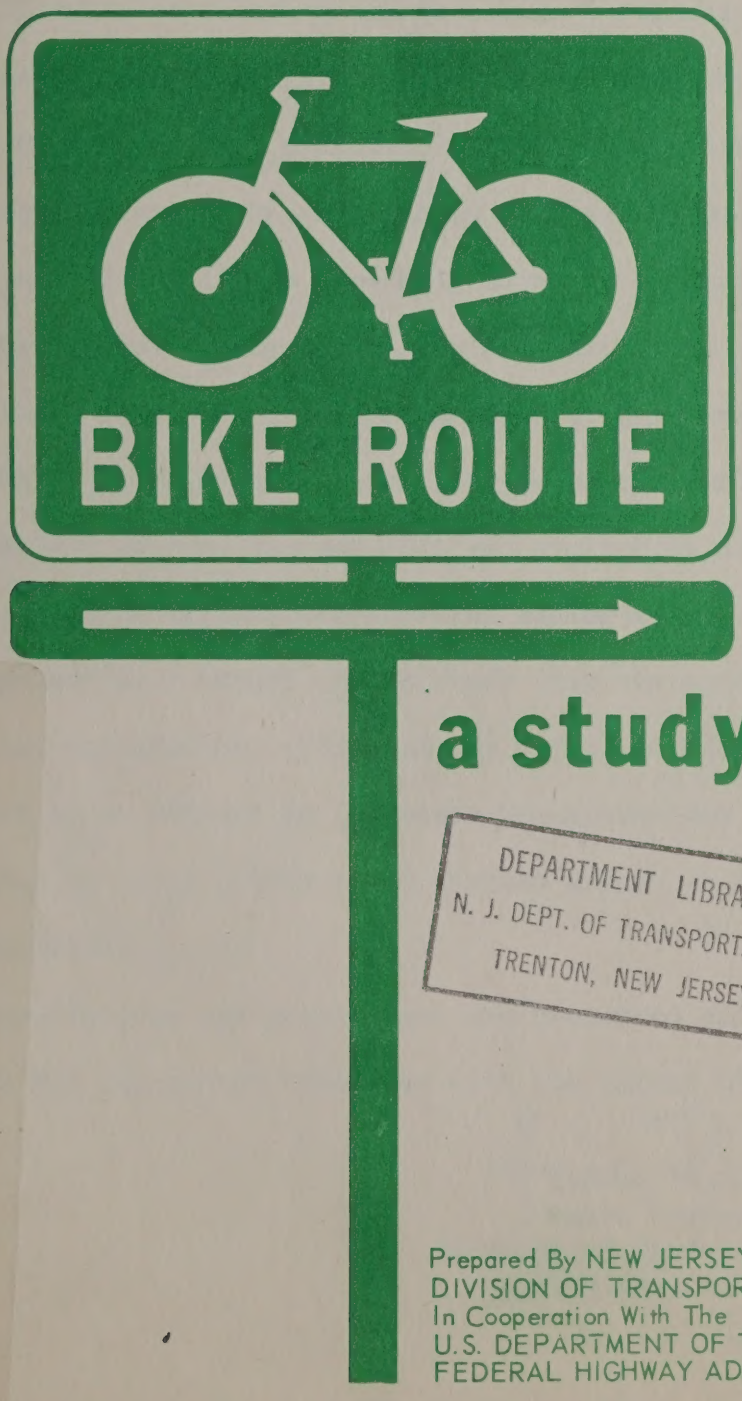
NEW JERSEY

BIKEWAYS FOR STATE HIGHWAYS



1973

a study of dual use

Prepared By NEW JERSEY DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION PLANNING AND RESEACH
In Cooperation With The
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

IN REPLY PLEASE REFER TO

State of New Jersey

DEPARTMENT OF TRANSPORTATION

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JANUARY 11, 1974

BIKE STUDY

NEW JERSEY DEPARTMENT OF TRANSPORTATION

The Division of Planning and Research is releasing for distribution copies of our feasibility study titled "Bikeways for State Highways - A Study of Dual Use" prepared in cooperation with the U. S. Department of Transportation Federal Highway Administration. The study is an analysis of conditions presently existing on state roadways in relation to their joint use by bicyclists and motorists.

The study is a product of recognition by planners of an increasing use by our citizens of the bicycle for recreation and transportation.

The safety of both the motorist and cyclist is of primary concern in evaluation of suitability for dual use of state highways. It has been recognized as a result of the study that the majority of state highways are not suitable for safe dual use under existing conditions. This report is an attempt to formulate procedures and establish guidelines for use by local planners and citizen groups in analysis of local roadway suitability.

Recommendations and conclusions are presented and serve as future guide posts for all groups concerned with the safety of the cyclist and motorist.

Keith Rosser
Director of Transportation
Planning and Research

BIKEWAYS for STATE HIGHWAYS

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1973

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I PREFACE

Throughout 1971 and early 1972, the New Jersey Department of Transportation received numerous inquiries from people all over the state concerning present or future sites where a cyclist could safely operate a bicycle. It soon became obvious that there existed a growing demand for bicycle thoroughfares. Therefore, in April 1972, the Division of Economic and Environmental Analysis began a study to investigate the feasibility of establishing a statewide system of bikeways.

II INTRODUCTION

A form of exercise and recreation has recently emerged from a juvenile related activity to one enjoyed by people of all ages. Bicycling is assuming a similar position to that which it enjoyed during the late 1800's. In 1890, there were two million adults riding bicycles, but this figure decreased rapidly with the invention of the automobile. As automobiles became more readily available, more and more adults abandoned the bicycle for the prestige of owning a "Horseless Carriage." The bicycle thus became the property of the young for transportation and recreation.

The attitude that a bicycle was merely a toy continued in this country for well over a half a century. The majority of the bicycles produced during this time period were geared towards the "young" consumer, as few adults purchased bicycles for their own use. But in the early 1960's, the number of adults purchasing bicycles began to increase. By 1971, adults were purchasing over 25% of the bicycles sold in America. Conservative estimates put the number of cycling Americans at 80 million people.[1] Bicycling seems to have returned as an American way of life.

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[1] Curtis J. Sitomer, "Bicycling: Spokesmen on the Grow," Christian Science Monitor, May 22, 1973.

What has caused this rebirth in cycling? The answer lies primarily in the object that replaced bicycles, namely the automobile. The 1960's brought on the trend towards exercise and physical fitness. The convenience of automobiles provided more leisure time for the average adult to get out and exercise. This, coupled with the revival of social acceptance of adult bicycling, was one of the major factors in the rebirth of cycling as a pastime. A second factor was that of physical fitness and the desire to get out and exercise, away from the congested urban and suburban areas existing in many states across the country. A final factor, was the growing concern by many young activists with air pollution caused by excessive use of motorized vehicles.[2]

This trend towards more and more use of the bicycle has spread across the country, including New Jersey. A summer drive through the shore resort areas, state and county parks, rural areas of South Jersey and many of the 568 incorporated municipalities in the state will reveal large numbers of cyclists, over one-third being adults. The increasing popularity of cycling shows no sign of a letup.

There are many uses for bicycles, but they ultimately fall into one of the following categories:

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[2] Ralph Hanneman, "Pedal Power," Parks and Recreation, Vol. VI, No. 1, Jan. 1971, p. 30.

Utilitarian: Several European countries have encouraged use of bicycles by constructing and maintaining extensive intercity and intracity bikeway systems. Commuters, as well as various businesses, are dependent upon bicycles for a quick, inexpensive means of transportation. In this country, young boys have relied on the bicycle to deliver newspapers, groceries, or for simply running errands. Messenger services in many large cities utilize bicycles for their ease of movement and parking within the central business district. In more recent years, some large, sprawling industrial complexes, that is, governmental installations and movie companies, have supplied bicycles for intramural transportation.

Recreation: "More people ride bicycles just for the plain fun of riding than probably for any other reason."[3] Children of all ages have frequently ridden bicycles as a means of recreation. Many of the more innovative youngsters have invented numerous games using the bicycle: for example, bicycle soccer, bicycle "tag," "follow the leader." Bicycle trade and user associations, such as the League of American Wheelmen, American Bikeway Foundation and Bicycle Institute of America, are encouraging cycling as a recreational activity by sponsoring tours, holding bicycle seminars and advocating safety programs.

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[3] Walter L. Cook, Bike Trails and Facilities, Wheeling, W. Va., American Institute of Park Executives, 1965, p. 5.

Physical Fitness: "Cycling for all ages is one of the best ways to accomplish and maintain physical fitness," says Dr. Paul Dudley White, noted American heart specialist.[4] Many adults have turned to bicycles as a means of keeping fit. It has proven more fun than jogging as one can cover longer distances and see more in a shorter period of time.

At this point, certain terms used throughout this report should be defined. These terms are adopted from the study conducted by the U.C.L.A. (University of California at Los Angeles) Institute of Transportation and Traffic Engineering for the California Department of Public Works, Division of Highways. They are as follows:

Bicycle Path (Class I): A bicycle path is an exclusive right of way for bicycles with minimal cross traffic; it could be through a park, along an abandoned railroad or inside the right-of-way fence of a freeway.

Bicycle Lane (Class II): A bicycle lane is a restricted right of way within a highway right of way to be used exclusively or semiexclusively by bicycles; it is usually separated from the traffic flow by either pavement markings or some sort of physical barrier. The barrier can be anything from a six inch curb to a reinforced guard rail, depending upon degree of separation desired.

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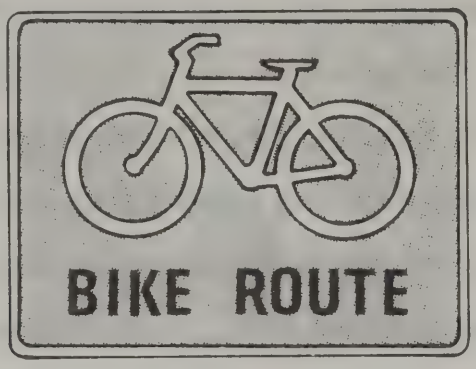
[4] Ibid.

Bicycle Route (Class III): A bike route is any right of way shared with motorized vehicles, designated as such by signs or pavement markings, that is, "Bike Route," "Bikeway" or the international symbol for a bike route (see below).



Finally, the term Bikeway or Bicycleway can be used to describe any of the above classifications.

III THE PROBLEM FOR NEW JERSEY

In the face of growing interest in bicycle riding, the question arose: What course of action should the New Jersey Department of Transportation take to provide some sort of bikeway system? An increasing number of letters addressed to the Department indicated a growing need for bikeways, and a belief that this Department is an agency which might undertake to provide at least some sort of bicycle facility. These letters came from school children desiring safe places to ride near their homes, adults requesting safe routes from the vicinity of their homes to their places of employment or some recreational area, and from organized bicycle clubs requesting that the Department of Transportation investigate the bikeway problem. Interests vary, but the objectives are all the same: Establish a safe place to operate a bicycle.

The lack of a safe place to ride in New Jersey is demonstrated by the 22 deaths, and over 1,800 injuries recorded in bicycle related accidents during 1972. Of the 22 deaths, 18 victims were under 15 years of age and 12 of those had not reached their teens. The combination of few locations where people could safely operate a bicycle and an ignorance of traffic laws and safety regulations were the major reasons for the high number of injuries to cyclists.

The problem of where to locate bikeways has been encountered by various other states. Wisconsin, the first state to establish a statewide bikeway, utilizes existing state and local roads. Approximately 90% of the bikeway uses lightly traveled county and local roads (Class III) while the other 10% is constructed upon an abandoned railroad right of way

(Class I). The bikeway is approximately 300 miles in length and runs generally east and west, from La Crosse on the Mississippi River to Kenosha on Lake Michigan.

Oregon, another leader in the formulation of bikeways, was the first state to pass legislation employing highway funds for the construction and maintenance of bikeways and footpaths along roads when reconstructed, constructed or relocated. The "1971 Bicycle Bill" provides that not less than 1% of funds received by any city, county or state agency from the State Highway Fund be expended for the establishment of bicycleways and footpaths.[5]

In 1971, the California Legislature recognized the burgeoning use of bicycles, and introduced and passed Concurrent Resolution 26. Resolution 26 called for the California Department of Public Works, Division of Highways, to authorize and fund a study to investigate various ways bicycles can effectively be accommodated on California streets and roads. The U.C.L.A. Institute of Transportation and Traffic Engineering was commissioned to conduct an extensive study on bikeways, and findings of that study have been considered in this report.

Actions taken by Oregon, California, Wisconsin and various other states caused Congressmen to introduce federal Legislation intended to make Federal funds available for bikeways. The most recent of this legislation is the amendment to the Omnibus Highway Bill proposed by

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[5] National Transportation Safety Board, Bicycle Use as a Highway Safety Problem, Washington, D.C., 1972, p. 11.

Representative James J. Howard (D-N.J.) and accepted by the House Public Works Committee. The amendment would encourage "the multiple use of highway rights of way, including the development, improvement, and use of bicycle transportation on or in conjunction with primary, secondary, and urban road systems."

On March 15, 1973, the above bill, including the bicycle appropriation amendment, was ratified by the Senate. It was then passed by the House of Representatives on August 3. Ten days later, President Nixon signed the Federal-Aid Highway Act of 1973. The sum of $40 million per year was made available for bikeways, with a maximum of $2 million per state on a matching funds basis.

IV OBJECTIVES

The objective of this study is to investigate the state's role in providing bikeway facilities for the ever increasing number of people interested in cycling. The primary objective is therefore to answer the three following questions:

1.) Can the Department of Transportation expeditiously provide a safe cycling network by assigning state highways the role of bike routes, utilizing existing shoulder areas in lieu of costly bikeway construction?

2.) Should the state undertake a more comprehensive feasibility study for the establishment of a broad network of Class I, II and III bikeways, identifying areas were bikeways would be feasible and problems associated with the development of these alternatives?

3.) What other alternatives are feasible as interim solutions to the bikeway problem?

V THE STUDY

Part A.-Use of State Highways for Bikeways

The U.C.L.A. Study effectively produced three potential ideas as to the basic type of bikeway the New Jersey Department of Transportation should initially study. Each class revealed advantages and disadvantages which had to be considered in order to decide upon a course of action. They are as follows:

Class I - Bicycle Path

ADVANTAGES:

1. Safest of the three classes; complete isolation from automobiles.
2. Could be placed on existing paths and trails such as canal tow paths or hiking trails.
3. Could be placed within existing DOT owned rights of way where sufficient lateral clearance can be provided.

DISADVANTAGES:

1. Most expensive; complete planning, design and construction needed.
2. Additional grading and landscaping required when placed within existing DOT owned rights of way passing through areas of extensive cut or fill.
3. Need of exclusive right of way.
4. Potential need to purchase additional right of way.
5. Design and construction would take time.
6. Maintenance responsibility.

Class II - Bicycle Lane

ADVANTAGES:

1. Could use existing street and highway rights of way.
2. Separated from motor vehicles by physical barriers.
3. Less expensive than Class I.

DISADVANTAGES:

1. Would eliminate parking or one traffic lane in urban areas.
2. Time factor in design and construction of barrier.
3. If additional right of way needed, would be more expensive than Class I bikeways.

Class III - Bicycle Route

ADVANTAGES:

1. Could use shoulder of existing highways.
2. Least expensive; only cost incurred would be for signing and pavement markings.
3. Could be implemented in the shortest length of time.
4. Maintenance of bikeway included in maintenance of shoulder.

DISADVANTAGES:

1. Close to the flow of traffic, creating a safety hazard.
2. Motor vehicles stopping on the shoulder for repairs.
3. On and off movements along areas of extensive strip development.

Since the first objective of this study was to investigate the feasibility of providing a temporary network of bikeways as quickly as possible, an initial decision had to be made as to which class of bikeways should the Department of Transportation study in order to accomplish this objective. Because of limited time and money available, it was decided

to study the utilization of existing state highways for Class III bikeways. Federal restrictions eliminated possible use of interstate routes while use of toll roads was precluded by their respective governing agencies. The study was therefore limited to the 1,877 miles of state highways.

The initial step of this study was to evaluate the shoulder area for its possible use as Class III bikeways. Each road section was evaluated and classified with respect to the shoulder width and condition and traffic volumes (based on 1971 Average Daily Traffic) recorded on each section of road. Criteria for a grading system was established as follows:

GREEN: conducive to safe riding; shoulder in good to excellent condition; 8-foot minimum width; traffic volume very low

BLUE: caution when using; shoulder in fair to good condition and/or traffic volumes could cause a safety hazard; 6-foot minimum shoulders

AMBER: Extreme caution when using; shoulder in fair to poor condition; less than 6-feet in width and/or traffic volume would cause a definite problem

RED: AVOID! no shoulder, curbed or extensive parking along a curb line; heavily traveled by all classes of vehicles. (Federal restrictions eliminate use of all interstates. State restrictions eliminate use of all State freeways, and the respective governing agencies restrict use of the New Jersey Turnpike, Garden State Parkway and Atlantic City Expressway.)

The four classifications resulted in two major categories: Acceptable and unacceptable; green and blue are considered acceptable while amber and red are unacceptable.

Once the evaluation criteria were determined, every foot of the 1,877 miles of state controlled highways had to be inventoried in order to correctly classify each road. Initially, each road was evaluated by viewing the photo-logging file, a series of still pictures taken every 1/100th of a mile in both directions of all state highways. Because actual shoulder condition at the time of the study was critical, it was decided to abandon the photo-logging file for a physical observation and classification of each highway.

Results of the State Highway mileage inventory were grouped in accordance with the five sections established for planning purposes in the Department's Master Plan for 1972 (Figure 1).

In the New York Metropolitan Area (Heart of Megalopolis or "HOM") most of the highway mileage was classified unacceptable because of the absence of a shoulder, extensive curb parking and high traffic volumes. In the Camden area (west of U. S. 206 in the "City to Sea" sector), similar conditions created a 69.5% unacceptability. In the "Corridor" section, high traffic volumes prevent most state highways from safely accommodating bicycles. Over 72% of the highway mileage classified as unacceptable lies within these three areas.

The northeastern ("Hills and Lakes") and southern ("Southern Plains") areas have seasonal traffic which swells traffic volumes in the summer, in contrast to urbanized areas and corridor sections where heavy traffic is uniform year-round. The flat southern section contains straight and relatively level roads, comfortable for bicycle riding where the traffic volumes are low. Conversely, many roads in the "Hills and Lakes" sector are replete with curves and long grades, generally not conducive to

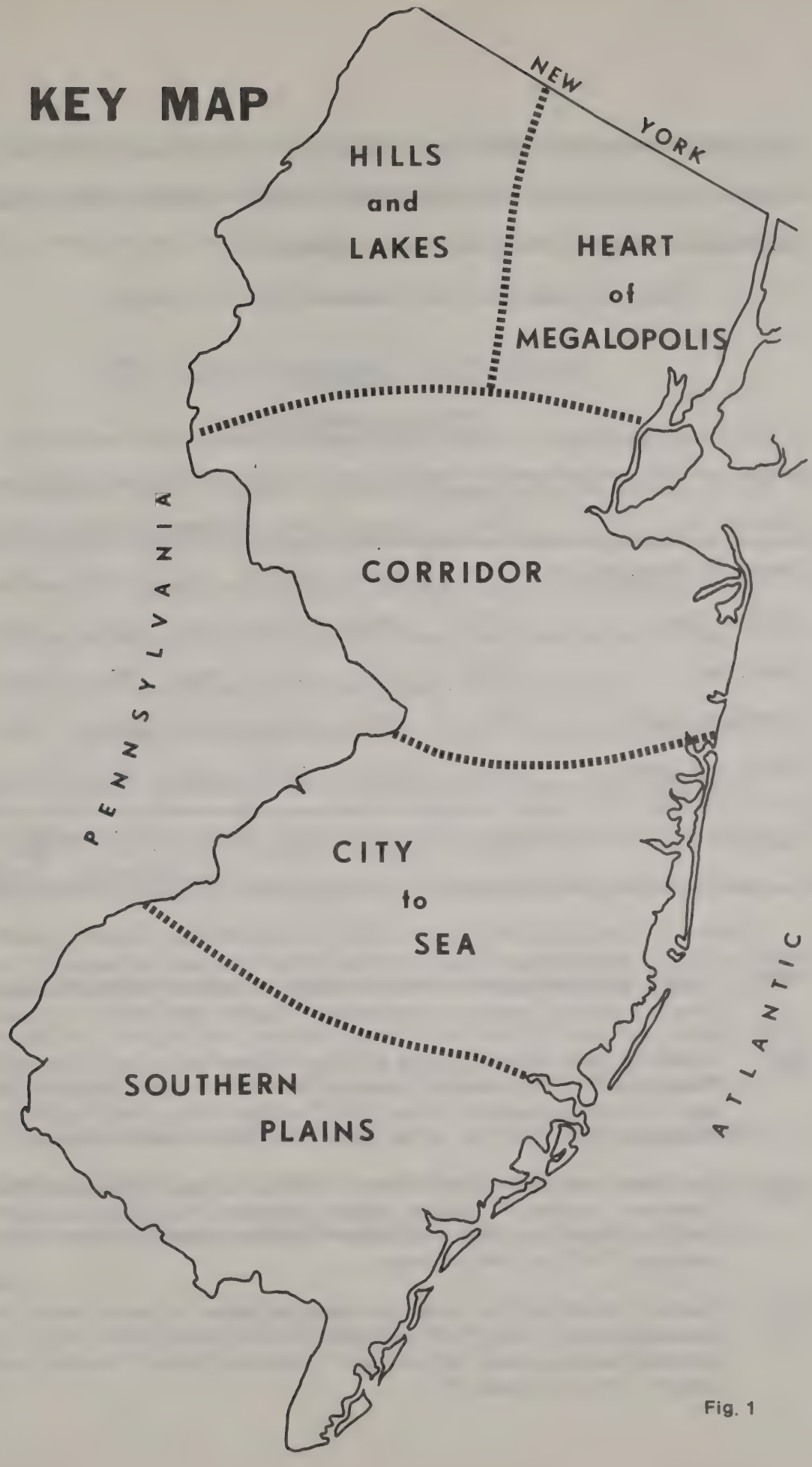
KEY MAP
NEW YORK
HILLS and LAKES
HEART of MEGALOPOLIS
CORRIDOR
CITY to SEA
SOUTHERN PLAINS
PENNSYLVANIA
ATLANTIC OCEAN

Fig. 1

bicycling. Therefore, the classification of the mileage in these two sectors, especially the Southern Plains, could flucuate greatly due to the seasonal traffic found on state highways.

Table I summarizes the inventory for each sector:

TABLE I

HIGHWAY CLASSIFICATION

Sector	Sq. Mi. Area	Total Miles %	Green	Blue	Amber	Red
Heart of Megalopolis	675	230.4 - 12.3	0	3.2	25.6	201.6
City to Sea	1770	376.5 - 20.0	131.4	92.7	75.4	77.0
Corridor	1770	516.7 - 27.5	38.5	90.1	213.1	175.0
Southern Plains	2030	442.9 - 23.6	214.8	143.6	56.4	28.1
Hills and Lakes	1660	310.8 - 16.6	14.9	62.6	125.5	107.8
Total	7835	1877.3 -100.0	399.6 21.3%	392.2 20.9%	496.0 26.4%	589.5 31.4%

GREEN - (fully acceptable) 21.3% of the total highway mileage is classified "fully acceptable," however a total of 86% of this mileage is located in two sectors--"Southern Plains" and "City to Sea."

BLUE - (caution when using) 20.9% of the highway mileage is classified for "caution." Every sector, except the "HOM" has a portion of its mileage in this category. The "HOM," along with a void of "acceptable" mileage, has only 3.2 miles which is considered rideable.

AMBER - (extreme caution) 26.4% of the highway mileage is classified for "extreme caution." Every sector contains "extreme caution" classified mileage, but the "Corridor" sector contained the highest percentage (43%) of the mileage.

RED - (avoid) 31.4% of the total highway mileage is considered totally unacceptable. The "HOM" contains the highest with 34% of the total unacceptable mileage while the "Southern Plains" sector contains the least with less than 5%.

The appendix (Section VIII) contains a detailed description of each state highway in each of the five sectors, including a map of each sector and a complete mileage breakdown, by color classification, of each highway.

Part B.-Development of Separate Bikeways

Throughout the study of Class III bikeways, possible areas for separate bikeways (Class I) were continually under consideration. No attempt was made to study the idea of separate bikeways in detail. Rather, information from meetings, publications and correspondence with bicycle advocates was continually gathered and analyzed to determine bicycle interest in New Jersey and throughout the country.

The information gathered revealed people of all ages were interested in future development of bikeways where they could ride with no fear of motorized vehicles. They felt that a bicycle sharing a road or highway with an automobile constitutes a danger to the cyclist. Many state highways, especially those in urban areas, are frequently crossed by local and secondary roads. Cyclists must be concerned with the traffic behind him going straight or turning right, the traffic coming towards him turning left across his path and/or the traffic coming out of secondary streets. This problem is compound along areas of high strip development where vehicles frequently pull into or out of gas stations or shopping centers. The solution was therefore a bikeway physically separated from the roadway.

The idea of separate bikeways creates as many additional problems as it solves. In using separate bikeways, motor vehicle--bicycle confrontation is eliminated. However, a safety problem still exists with cyclists who are not aware that highway etiquette also applies to them as operators of a vehicle, that is, keeping to the right, yielding right of way, etc. Misuse of a separate bikeway by only a few individuals can make it unattractive to a majority of users.

Another safety problem related to separate bikeways is their potential use by other modes. A well planned network of bicycle trails and paths might also be attractive to people who ride mini-bikes, horses, or snowmobiles. Presence of these various modes could cause problems for the bicyclists, and could create hazards similar to those existing on the highways.

Policing of bikeways is a third problem that must be dealt with in establishing separate bicycle facilities. Highway law enforcement by local and state police is taken for granted. The same should be established for bikeways. The question of who will police a particular bikeway could create problems in terms of accidents and traffic control.

Part C.-The Bicycle Demand

Numerous cyclists were interviewed throughout the study in an attempt to gauge demands for bikeways. Unofficial results revealed there is a basic demand for some sort of bikeway, especially in areas of high population concentration. There are various groups with various cycling objectives. However, they all fall into one of the following groups:

1.) The Adolescent Group - consisting of children up to 18 years of age, is by far the largest group riding bicycles. Bicycles are an inexpensive form of transportation and recreation for the younger members of this group. More than 90% of children in grades 2 through 8 ride bicycles, mostly in the vicinity of their homes, on local streets, to and from school, and in local parks and playgrounds.[6] Older children and teenagers (14-18) engage in short or day trips away from their home areas. Many individuals in this group lack a basic knowledge of motor vehicle regulations, which also apply to cyclists using any municipal, county or state roadway. Many young cyclists ride on the left side of the road facing traffic (the old "Mothers' tale"), creating an extreme safety hazard and a breach of the law. This group must be educated in traffic safety to eliminate many senseless accidents.

2.) The Adult Group - though small compared to the adolescent group, has been increasing in numbers over the last two to three years. The League of American Wheelmen revealed that of the 11.5 million bicycles sold in 1972, about half were purchased by adults. Many adults ride bicycles for recreation and physical fitness, but a few also use bicycles for short duration trips, that is, commuters riding their bikes to train stations. Many adults have engaged in cycling as a family function, making short trips with their children. A portion of this group, especially those in urban areas, is transporting their bicycles by car to state or local parks or rural areas to avoid heavily traveled streets.

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[6] National Transportation Safety Board, Bicycle Use As A Highway Safety Problem, p. 1.

This idea is obviously becoming more popular with the appearance of more and more bicycle racks on automobiles.

3.) The Touring Clubs - contain individuals from the adult group who are avid cyclists and enjoy organized bicycle trips. The number of people in touring clubs is a very small percentage compared to the total number of people currently involved in cycling. Organizations such as the Metuchen Bicycle Touring Society and Tri-boro Bicycle Touring Club engage in day, weekend and even week-long trips on bicycles. The Metuchen Club makes a trip from Port Jervis to Cape May every Memorial Day Weekend. Interviews with touring club members have revealed they rarely use state highways, rather, they restrict their travels to lightly traveled county and local roads.

4.) The Racing Clubs - are the smallest group of cyclists represented in New Jersey. Only two known clubs, the Century Road Club of America, located in Princeton, and Somerville Racing Club, are involved with bicycle racing in New Jersey. They need either long stretches of flat, smooth riding surfaces or velodromes (banked bicycle tracks) because of the special bicycles they use for racing. Lack of such facilities caused the 1972 New Jersey State Championships to be held at a New York track.

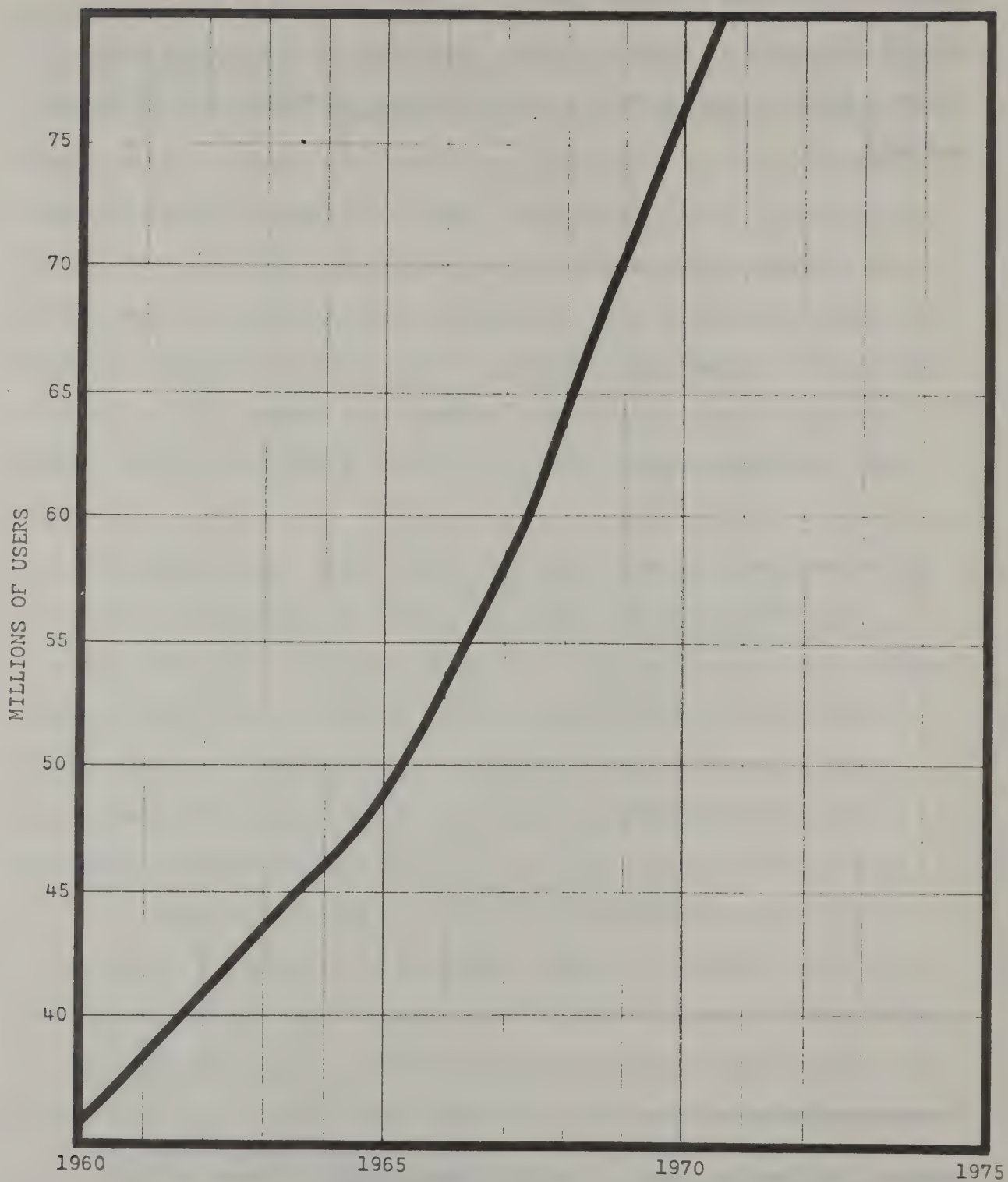
One important fact that had to be determined was the status of cycling in New Jersey. Is the sudden interest in cycling by adults a new fad, to diminish with the appearance of another physical fitness craze, or is it something local, county and state governments should plan to deal with? If national growth trends observed in the number of bicycle users

over the last decade continue (graph 1)[7], there could be as many as 100 million bicyclists in America by 1980. Bicycling in this country could assume a position similar to that which it holds throughout much of Europe and Asia.

[7] A. Trent Germono, Paul H. Wright, R. Gray Hicks and Paul H. Sanders, The Emerging Needs of Bicycle Transportation (School of Civil Engineering, Georgia Institute of Technology, 1973, p. 2.

Graph 1.

BICYCLE USERS



(Source: A.T.Germano, P.H.Wright, R.G.Hicks, P.H.Sanders, "The Emerging Needs of Bicycle Transportation", Georgia Institute of Technology, presented at the Highway Research Board Annual Meeting, January, 1973.)

VI CONCLUSIONS

Throughout the course of this study, various points were examined in order to answer the three basic questions put forth in the objective: namely, can the Department utilize state highways for bikeways, should it conduct a more comprehensive feasibility study towards a broad bikeway network, and what other alternatives are available for interim solutions. The following conclusions reflect the findings of this study:

1. Use of most New Jersey State Highways as Class III bikeways is not feasible. Various factors were considered in analyzing each section of highway, but one factor continually influenced the classification--present and projected traffic volumes created a definite safety problem. In areas where traffic volumes did not adversely affect the classification, many state highways were classified as acceptable.

2. Current popular interest in bicycling, derived from recorded and projected bicycle sales, justifies the New Jersey Department of Transportation to: a) recognize bicycling as more than a recreational fad, and b) conduct a further study into providing bikeways.

3. The question of safety is a primary consideration in arriving at conclusions 1 and 2. The Department of Transportation can designate certain roads as bike routes, however, it cannot control high traffic volumes that create the safety problems. Traffic flow in close proximity to cyclists creates a safety problem.

4. Procedures used in developing New Jersey's bikeway network will be similar to those used in developing highways; however, a different set of warrants for bicycle traffic must be established.

5. A further bikeway feasibility study must consider the following points: Authorization, financing, location and design criteria, construction and maintenance, and traffic control and policing.

6. Primary needs are currently at the municipal level and in recreational areas.

7. Bicycle trail development is possible on lands not under public ownership; jurisdiction for developing privately owned areas such as abandoned rights of way and utility easements (gas, oil, powerlines) must be studied.

8. As an interim step, lightly traveled roads, streets, and highways will have to temporarily accommodate bicycle traffic.

9. Solutions to the "bicycle question" are being developed differently throughout the country, and master plans are needed.

10. Any concept of a statewide network, or even a city or county network of bikeways is a planning and funding question of major proportions.

VII-RECOMMENDATIONS

Findings of this study lead to the following recommendations for future New Jersey Department of Transportation bicycle related activity:

1. Encourage the Legislature to consider a one-time appropriation to commission a comprehensive study of bikeway needs in New Jersey. The study should include, but not be limited to, the following: a) the feasibility and demand in urban, suburban, and rural areas; b) an outline depicting how municipalities and counties might establish master plans; c) a provision of sufficient funds for demonstration projects. One such demonstration project could be a bikeway similar to the Wisconsin Bikeway (page 6), running generally north and south from High Point State Park to Cape May.

2. Limit designation of state highways as bikeways for the present to those routes capable of safely accommodating bicycle traffic, and to those which can serve as links between networks developed by others--state agencies, counties, park commissions, municipalities.

3. Encourage counties, municipalities and private groups to conduct studies for the establishment of limited bikeway networks throughout New Jersey. If a portion of this network must utilize a state highway, the state should cooperate with the planning agency in the formulation of the bikeway along state property. Coordination between government agencies should follow similarly to that employed in coordinating highway planning, design, construction and maintenance.

4. Include in all future highway feasibility, location and design studies consideration of separate bikeways which might serve as adjuncts or parts of a regional bikeway network.

5. Maintain statewide surveillance of bicycle transportation demand and needs.

6. Maintain liaison with Department of Environmental Protection for possible joint developments embracing state parks and highways.

7. Further study should be conducted in the following areas:

   a. bikeway demand and ways of measuring same
   b. development of a bikeway master plan, providing demand indicates cross-state bikeway needs
   c. legislation needed

7. d. financing

   e. design and construction criteria

   f. maintenance and policing

   g. accommodation of other trail types in bikeway right of way.

8. Propose a state interagency task force to coordinate jurisdictional interests and planning within the departments involved: Transportation, Law and Public Safety, Environmental Protection, Education, Community Affairs, Public Utilities Commission and Treasury.

9. Encourage safety education programs for both cyclists and motorists. They must be aware of the rights they each possess in using highways. (NOTE: The Office of Highway Safety currently has a program aimed at children in grades 2 through 8. A kit containing a film on bicycle safety, posters, reflector dots for bicycles, a teachers' guide and a letter from Governor Cahill was sent to 2,611 elementary schools throughout New Jersey. Its purpose is to educate the children in highway safety, etiquette and traffic regulations that also apply to automobiles. A similar program aimed at adults is available through the local law enforcement agencies.)

VIII-APPENDIX

A. Highway Mileage Inventory

1. Heart of the Megalopolis
2. City to Sea
3. Corridor
4. Southern Plains
5. Hills and Lakes

B. Bibliography


HEART of MEGALOPOLIS
LEGEND
GREEN
BLUE
AMBER
RED
STUDY
NEW YORK
BERGEN
PASSAIC
MORRIS
ESSEX
UNION
HUDSON
PARAMUS
PATERSON
HACKENSACK
NEWARK
JERSEY CITY
WASHINGTON
BRIDGE
LINCOLN
TUNNEL
HOLLAND
TUNNEL

Fig. 2

1. HEART OF THE MEGALOPOLIS

The "Heart of the Megalopolis" (figure 2) is located in the northeastern section of the State, directly across the Hudson River from New York City. Within this 675 square mile area are the major cities of Newark, Jersey City and Elizabeth. This highly urbanized area is found to provide few State highways upon which to safely ride. The fact that 98% of the State highways in this sector are classified amber or red, is reflected by the total mileage breakdown on Table II. Only two roads in the "HOM" sector are classified higher than amber, a 1.9 mile section on Route U. S. 9W and Route N. J. 159 in West Caldwell, Essex County.

No single reason is sited why the majority of the highways in the "Heart of the Megalopolis" are classified amber and red. Rather, it is a combination of circumstances which produce the 98% unacceptability of State highways as potential bikeways. Route U. S. 1 & 9, from Linden, past the Newark Airport to the George Washington Bridge is a prime example of how a combination of circumstances along the length of the road result in an unacceptable classification. The curbing, the narrowness of Tonnelle Avenue through Hoboken, North Bergen and West New York and the high traffic volumes, collectively or singularly, necessitate the red classification.

There are three major links between the "Heart of the Megalopolis" and New York City: The George Washington Bridge, Lincoln Tunnel and Holland Tunnel. These three links generate over 335,000 vehicles per day (1970 ADT) from New York City to the numerous State

highways that radiate through the "HOM." The George Washington Bridge is the focal point for the Federal aid primary roads in the northern portion of the sector while the Holland and Lincoln Tunnels service the southern portion of the sector. In each case, traffic moving to and from New York creates an extreme safety hazard to cyclists.

Many of the 194,000 vehicles (1970 ADT) generated by the George Washington Bridge are disseminated among the numerous State and local roads that radiate from the vicinity of the Bridge:

U. S. 46 & N. J. 4 - N. J. 4 and U. S. 46 run generally east and west, and are both considered unacceptable as bikeways due to the lack of shoulder area and extremely high volumes. The presence of I-80 does little to relieve the eastbound and westbound traffic of U. S. 46 and N. J. 4. Therefore, use of these two highways as bike routes presently or in the future seems highly unlikely.

N. J. 17 - N. J. 17 north of U. S. 46 is a very wide road with high traffic volumes and many business concerns (gas stations, resturants, shopping centers, etc.) lining both sides of the highway. Some sections possess 10 foot shoulders, but future traffic forecasts deter any possibility of increasing the classification.

U. S 9W - Much of the through traffic that would ordinarily use this narrow, shoulderless highway is diverted to the Palisades Interstate Parkway. If the improvements outlined in the 1972 Master Plan for U. S. 9W were implemented, the classification could be increased, providing the traffic volume does not increase.

Further south, the Holland and Lincoln Tunnels link Newark and Jersey City to Lower Manhattan. The traffic from the Lincoln Tunnel feeds directly to Route 3, one of the few roads to cross the Hackensack Meadowlands, and the New Jersey Turnpike. The volume of traffic on Route 3, combined with the presence of two turnpike interchanges, necessitate the red classification.

In Hoboken, the Tonnelle Avenue Circle serves as a collector for the Holland Tunnel approach (U. S. 1B) and three heavily traveled highways, Tonnelle Avenue from the north, the Pulaski Skyway from the west, and U. S. 1 & 9 Truck from the south:

U. S. 1 & 9 (Tonnelle Avenue) & U. S. 1 & 9 Truck - These two roads are very similar in that they both have a very high volume of truck traffic, are very narrow and are curbed from Newark, through Jersey City and Hoboken to the George Washington Bridge. Any formal use as a bikeway is not practical.

U. S. 1 & 9 (Pulaski Skyway) - The Pulaski Skyway is the only major toll free link between the Newark Airport and the Holland Tunnel. The extreme narrowness of this heavily traveled viaduct completely eliminates it from any sort of consideration as a bikeway.

Connecting the three major networks that radiate from the George Washington Bridge, the Holland and Lincoln Tunnels are three State Highways, N. J. 7, N. J. 21, N. J. 17.

N. J. 7 - N. J. 7 is a narrow, shoulderless two lane highway passing through the southern most portion of the Hackensack Meadowlands near Kearney. It becomes a city street (Washington Avenue), with extensive curb parking, once it crosses the Passaic River north of Newark. In both cases, the physical characteristics necessitated the red classification.

N. J. 21 (McCarter Highway) - N. J. 21 begins at the Interchange of U. S. 22 and U. S. 1 & 9 near the Newark Airport. It runs through downtown Newark as a city street, with curb parking on both sides and high traffic volumes. North of N. J. 7, Route 21 becomes a limited access freeway. The red classification assigned to N. J. 21 has little hope of being changed due to projected traffic volumes.

N. J. 17 - N. J. 17 (Ridge Road) from N. J. 7 to N. J. 3 is a city street with curb parking along much of its length as it passes through the suburban towns of North Arlington and Lyndhurst. North of N. J. 3 to U. S. 46, N. J. 17 is a heavily traveled, divided highway with extensive strip development. The classification of amber is given to this section because of the 8-foot paved shoulder, but future increase in traffic volume will probably create a red classification.

The remaining State highways away from the heavily populated and highly congested Metropolitan Areas of Newark, Jersey City and Hackensack are also classified unacceptable, but for reasons other than those cited in the urbanized areas.

N. J. 27 and N. J. 28 - N. J. 27 (Rahway Avenue and St. George Avenue) and N. J. 28 (Westfield Avenue) emanate from Elizabeth, through the city streets of Linden and Roselle to the suburbs. They both have extensive curb parking, numerous cross streets and high traffic volumes, making their future use as bikeways highly unlikely.

N. J. 22 - N. J. 22 is a very heavily traveled, divided highway with little or no shoulder along much of its length within the "HOM" sector. The numerous business concerns generating on-off movements along most of N. J. 22 assures a red classification.

In the west, Routes N. J. 23 and 10 and Route U. S. 46 service the mountainous areas in Passaic and Essex Counties. Each is classified unacceptable for the following reasons:

N. J. 10 - N. J. 10 (Mt. Pleasant Avenue) is a narrow, two lane road with little or no shoulder area. The moderate traffic volumes, mostly local traffic, create a safety hazard in the hilly suburban areas of Essex County.

N. J. 23 - N. J. 23 (Pompton Avenue in Essex and part of Passaic Counties) also ascends hilly areas in the west, but it is curbed and more heavily traveled. It is the only major road extending west from the "HOM," to Passaic and the northern sections of Morris Counties.

U. S. 46 - U. S. 46, in most places, is a wide, well paved highway, but there are extensive stretches where no shoulder exists. Very high traffic counts are the major deterrents which forbid U. S. 46 from becoming a bikeway.

The northern part of the sector contains three State controlled highways, N. J. 208, N. J. 17 and U. S. 9W previously discussed.

N. J. 208 - N. J. 208 is a divided highway and fairly heavily traveled. Because it passes through hilly terrain in Bergen County, quite often climbing lanes are present along the curb lines, leaving no place to safely ride a bicycle.

N. J. 17 - N. J. 17, north of Paramus and Garden State Parkway, has a wide shoulder in fair condition, but high traffic volumes and the frequency of on and off movements permit nothing better than an amber classification.

The remaining 14 State highways located in the "HOM" have varing circumstances which caused their unacceptability.

N. J. 5, N. J. 63, N. J. 67, N. J. 93 - These four State highways are located in the Fort Lee/Palisades Park area, a suburban section south of the George Washington Bridge. Though moderately traveled, each road lacks the minimum shoulder width for an acceptable classification.

N. J. 20, N. J. 82 - N. J. 20 and N. J. 82 are both classified red because of very high traffic volumes using each road, regardless of the minimum shoulder present on both roads.

N. J. 62, N. J. 161 - N. J. 62 and N. J. 161 pass through the heavily traveled local streets of Totowa and Passaic, respectively. The traffic problem and curb parking create red classifications.

N. J. 153 - N. J. 153 is old N. J. 3 in Secaucus. It is heavily traveled by local traffic and has a high frequency of curb and double parking.

N. J. 169 - N. J. 169 is used almost exclusively by truck traffic moving from the New Jersey Turnpike to the Bayonne industrial area and the Bayonne Bridge. Although it has a 6 to 8 foot shoulder, the high truck volumes negate its availability as a bikeway.

N. J. 439 - N. J. 439 is a heavily traveled city street in Elizabeth with parking along much of its length, therefore a red classification.

N. J. 440 - N. J. 440 is located on the west side of Jersey City. The 8-foot oil gravel shoulder is in a high state of disrepair. Coupled with the moderate traffic volume, N. J. 440 is classified unacceptable.

N. J. 444 - N. J. 444 is a 4 mile section of the Garden State Parkway under New Jersey Department of Transportation jurisdiction.

N. J. 159 - N. J. 159 is the only other State highway in this sector classified acceptable. The 1.3 mile road is lightly traveled and has an 8-foot, well paved shoulder.

All State controlled highways in the "HOM," especially in highly urbanized areas, have very high traffic volumes. The traffic problem, combined with physical restrictions on approximately 23 of the State highways located within the sector, creates the 98% unacceptability of the mileage in the sector. In many places, the traffic volume is the sole determining factor causing the red or amber classification.

TABLE II

HIGHWAY CLASSIFICATION BY TOTAL MILES

HEART OF MEGALOPOLIS

Route	Total Miles	Green	Blue	Amber	Red
U.S. 1 & 9	22.5	-	-	-	22.5
U.S. 1B	2.6	-	-	-	2.6
U.S. 1 & 9T	4.2	-	-	-	4.2
N.J. 3	10.8	-	-	2.7	8.1
N.J. 4	10.8	-	-	-	10.8
N.J. 5	3.2	-	-	.8	2.4
N.J. 7	9.9	-	-	.8	9.1
U.S. 9W	11.2	-	1.9	1.2	8.1
N.J. 10	6.1	-	-	1.2	4.9
N.J. 17	25.7	-	-	10.2	15.5
N.J. 20	3.9	-	-	-	3.9
N.J. 21	11.4	-	-	-	11.4
U.S. 22	13.3	-	-	-	13.3
N.J. 23	15.3	-	-	2.7	12.6
N.J. 27	1.8	-	-	-	1.8
N.J. 28	5.5	-	-	-	5.5
U.S. 46	23.4	-	-	-	23.4
N.J. 62	2.2	-	-	-	2.2
N.J. 63	3.1	-	-	1.5	1.6
N.J. 67	2.0	-	-	-	2.0
N.J. 82	4.9	-	-	-	4.9

TABLE II (Cont'd.)

Route	Total Miles	Green	Blue	Amber	Red
N.J. 93	3.4	-	-	3.4	-
N.J. 153	1.4	-	-	-	1.4
N.J. 159	1.3	-	1.3	-	-
N.J. 161	1.1	-	-	1.1	-
N.J. 169	1.9	-	-	-	1.9
N.J. 208	11.0	-	-	-	11.0
N.J. 439	4.2	-	-	-	4.2
N.J. 440	8.4	-	-	-	8.4
N.J. 444	3.9	-	-	-	3.9
Total	230.4	-	3.2	25.6	201.6
%	12.3%	-%	1.4%	11.1%	87.5%

City to Sea


CITY TO SEA
FRANKLIN BRIDGE
FORT DIX
TOMS RIVER
POINT PLEASANT
OCEAN
BURLINGTON
HAMMONTON
NEW GRETNA
BOTTOM
LEGEND
GREEN
BLUE
AMBER
RED
NOT UNDER

2. CITY TO SEA

The "City to Sea" sector (figure 3) is located in the south central part of the State. The City of Camden, located directly across the Delaware River from Philadelphia, is the only large urban area in this 1,770 square mile sector. The State highways in the Camden area, are found to be highly congested with traffic, and therefore, unsafe to be used as bikeways.

There is a total of approximately 152 miles of State highways in the "City to Sea" sector classified amber or red (Table III), 110 miles of which lies in and around the Camden area. Of the 110 miles of State highways, only three miles lie within the Camden city limits. The principal arterials that radiate out from Camden and the Ben Franklin Bridge, which connects the Central Business Districts of Philadelphia and Camden, constitutes the majority of the remaining 107 miles.

U. S. 30 - U. S. 30 (Admiral Wilson Boulevard) constitutes the only major State highway within the Camden city limits, (N. J. 151 is a local street in Camden). U. S. 30, which extends from the Airport Circle to the Ben Franklin Bridge, is an eight lane, divided highway with extremely high traffic volumes (90,000 - 1970 ADT). The lack of a shoulder and the presence of numerous automobile dealers, gas stations and motels completely eliminates U. S. 30 as a bikeway.

The Airport Circle, located in Pennsauken, serves as a converging point for the Admiral Wilson Boulevard, U. S. 130, U. S. 30/130 and N. J. 38/70. The following conditions result in a red classification for each highway, and any possible use as bikeways seems highly unlikely.

U. S. 130 - U. S. 130, from the circle north to N. J. 73, is a narrow, 6-lane curbed highway with numerous businesses lining both sides of the road. The classification is further justified by the presence of a high traffic volume.

U. S. 30/130 - U. S. 30/130 is a short connector between the Airport Circle and U. S. 30 and U. S. 130 (South) circle in Collingswood. It is a narrow 4-lane curbed highway with very high traffic volumes.

N. J. 38/70 - N. J. 38/70 is a short, 8-lane connector from the Airport Circle to the N. J. 38/70 Interchange. It is very heavily traveled and has numerous on-off movements.

In the suburban and rural areas around Camden, the classifications remain unsuitable on most of the highways. Some lightly traveled roads in the rural areas are classified acceptable, but should traffic volumes increase, they also would be classified unacceptable.

U. S. 130 - U. S. 130 is classified red from N. J. 73 north to Burlington because of extremely high traffic volumes and numerous shopping facilities, gas stations and motels lining both sides of the right of way. North of Burlington, Route 130s classification increases as it passes through a very sparsely populated area. I-295, upon its completion to Trenton, will initially relieve much of the traffic on U. S. 130, but projected traffic trends for the future show continued high traffic volumes on U. S. 130.

N. J. 38 - N. J. 38 has a 12-foot paved shoulder along much of its length from the N. J. 70/N. J. 38 Interchange to N. J. 73, but very high traffic volumes and extensive strip development on both sides of the highway necessitates a red classification. East of I-295, N. J. 38 becomes a wide, 2-lane highway with paved shoulders, but traffic volumes and numerous on-off movements cause an amber classification.

N. J. 70 - N. J. 70 is classified unacceptable from the Interchange with N. J. 38 east to Medford. In the sections classified red, there exist very high traffic volumes, spot parking along the side of the road, and numerous business concerns along the roadway. East of the New Jersey Turnpike, there exist decent shoulders, but high traffic volumes, the combination of which necessitate the amber classification.

U. S. 30 (White Horse Pike) - U. S. 30 is a narrow, 4-lane, curbed highway from the circle in Collingswood, through the suburban towns of Audubon, Somerdale and Lindenwold to Berlin. South of Berlin to the sector limits, U. S. 30 possesses a narrow 2-3 foot shoulder. The Atlantic City Expressway and North-South Freeway (N. J. 42) have eliminated much of the traffic, but the physical aspects of the White Horse Pike prevent a higher classification. These restrictions and projected increases in traffic volume eliminate any possibility for future use as a bikeway.

N. J. 73 - N. J. 73 is classified unsuitable from the Tacony-Palmyra Bridge to the New Jersey Turnpike because of very high volumes of traffic using the Bridge and the absence of a shoulder along much of the road. South of the turnpike, a combination of reduced traffic volumes and wide, well paved shoulders provided for an acceptable classification.

N. J. 41 - The 3.5 mile section of N. J. 41, between N. J. 70 and N. J. 73, is classified amber because of poor shoulder conditions and high traffic volumes. The remaining portion south of Camden is classified blue because of the fair shoulders and low traffic volumes.

N. J. 42 - N. J. 42 (North-South Freeway) is a limited access freeway from I-295 south to its intersection with the Atlantic City Expressway. The remaining portion, from the Expressway south to the sector limits, is a 4-lane divided highway with excellent shoulders. The area near the Atlantic City Expressway is highly congested while the section further south is open and sparsely populated. The classifications of amber and blue reflect this situation.

N. J. 44 - N. J. 44 is a narrow, 2-lane road passing through rural areas adjacent to the Delaware River. It is classified blue because of very low traffic volumes, regardless of insufficient shoulder area.

N. J. 45 - N. J. 45 begins in Westville and proceeds south through Woodbury to the sector limits. The entire portion is classified either red or amber because of curb parking and high traffic volumes in Woodbury, and poor road conditions south of Woodbury. (The section graded amber was under construction. Upon completion, a portion of that section could be reclassified blue.)

N. J. 47 - N. J. 47 is a two lane local street beginning in Westville. The unacceptable classification changes to acceptable south of the turnpike because of good shoulders and low traffic volumes. This condition exists to the sector limits.

U. S. 130 - U. S. 130, south of Camden, has similar conditions as U. S. 130 north of the Airport Circle. It lacks shoulders, contains high traffic volumes and has numerous business concerns lining both sides of the highway. U. S. 130 becomes coincident with I-295 in Westville, thus eliminating any possibility of future use as a bikeway.

N. J. 168 (Black Horse Pike) - N. J. 168 passes through the built-up areas of Bellmawr, Runnemede and Blackwood as a curbed, very heavily traveled roadway. The one section classified blue results from the presence of N. J. 42 diverting most of the traffic volume from N. J. 168 .

N. J. 154 (Bruce Road) - N. J. 154 is the only State highway in the immediate Camden area classified green. It has wide, well paved shoulders and very low traffic volumes, most of which is local traffic.

A vast pineland and wooded area exists in the central and eastern parts of the "City to Sea" sector. This area, which encompasses approximately 75% of the total area of the sector, contains only five State highways, each classified acceptable or partially acceptable.

U. S. 206 - U. S. 206 begins at U. S. 30 in Hammonton and runs almost due north to Trenton. It is classified green and blue because of wide shoulders and low traffic volumes. A short section north of Mt. Holly is classified amber because of poor shoulder conditions, which could be changed if improvements were made to the shoulder area. Another short section of U. S. 206 in the vicinity of the New Jersey Turnpike Interchange Number 7 is classified amber because of high traffic volumes around the turnpike.

N. J. 68 - N. J. 68 is a lightly traveled spur from U. S. 206 to Fort Dix. The blue classification results from the shoulder being in fair condition.

N. J. 70 and N. J. 72 - N. J. 70 (from Medford to Pt. Pleasant) and N. J. 72 (from N. J. 70 to Long Beach Island) are both acceptable as bike routes. Both highways possess wide, paved shoulders with seasonal but low traffic volumes. Class I bikeways could be included in the dualization planned for both highways.

U. S. 9 - U. S. 9 (from New Gretna to Tom's River) has wide, well paved shoulders and low traffic volumes. Much of the traffic that formerly used U. S. 9 is diverted to the Garden State Parkway, allowing an acceptable classification along most of the 45 miles located within the sector. The short sections classified unacceptable are the portions passing through built-up areas of Tuckerton and Tom's River.

A final area to be considered is the northeast section of the "City to Sea" sector. This area is quite built-up and maintains a high seasonal population.

U. S. 9 - U. S..9 (from Tom's River to Lakewood) has 6-8 foot wide shoulders and relatively low traffic volumes, thus a blue classification. With any substantial volume increase, the classification along this portion of U. S. 9 would change to amber.

N. J. 37 - N. J. 37 meets the requirements for an acceptable bikeway from N. J. 70 to Tom's River. It has similar physical characteristics in Tom's River, however the appearance of extensive strip development along the right of way and an increase in traffic volume create a safety hazard. East of Tom's River, a 12-foot, paved shoulder and a lower volume permits a blue classification. Any increase in the volume will cause an amber classification.

N. J. 166 - N. J. 166, through Tom's River, is old U. S. 9. It contains only local traffic, is narrow in some places and lacks a shoulder in others. The various physical conditions create the three classifications.

N. J. 35 - N. J. 35 in Seaside Heights is a 4-lane road with northbound lanes separated from southbound lanes by a couplet. Each direction has very wide, well paved shoulders, excellent for cycling. The 4-lanes converge in Mantoloking to 2-lanes, thus reducing the classification to blue, then to amber in the more congested Point Pleasant area. Traffic volumes on N. J. 35 are seasonal in nature, which would cause a fluctuation in the classification of the road from winter to summer.

N. J. 88 - N. J. 88 is a 2-lane road with a narrow shoulder and numerous business concerns lining much of its 7.3 miles. It is classified amber because of high traffic volumes during the summer months, but could be considered acceptable during the winter.

N. J. 167, N. J. 170, N. J. 180 - These three State highways were formerly U. S. 9, U. S. 206, and N. J. 72 respectively. N. J. 167 is a dead-end road with no traffic at all, therefore an excellent place to ride. N. J. 170 and N. J. 180 are very lightly traveled, but are narrow with little or no shoulder, therefore the blue classifications.

The "City to Sea" sector is quite similar to the "Heart of the Megalopolis," but on a slightly lesser scale. The size of the Camden urban and suburban area is much smaller than the Elizabeth-Newark area, but the same basic conditions exist. Camden is located across from a major urban center, Philadelphia, as is the Elizabeth-Newark urban area. The links between Philadelphia and Camden are very heavily traveled, and the highways extending from these links are also heavily traveled by both interurban and local traffic. Outside the immediate Camden area, the condition of the shoulders improved to warrant possible use as bikeways, but traffic volumes remained too high to allow an acceptable classification. The similarity ends with the highways in the huge tract of undeveloped land in the central and eastern portions of the sector. The remoteness of these highways permit green and blue classifications, something that the "Heart of the Megalopolis" lacks.

TABLE III

HIGHWAY CLASSIFICATION BY TOTAL MILES

CITY TO SEA

Route	Total Miles	Green	Blue	Amber	Red
U.S. 9	44.9	25.4	11.1	6.0	2.4
N.J. 13	.1	-	-	.1	-
U.S. 30	28.9	-	-	10.6	18.3
N.J. 35	12.4	5.2	4.5	1.9	.8
N.J. 37	13.4	6.0	4.6	1.8	1.0
N.J. 38	16.8	-	-	9.8	7.0
N.J. 41	8.3	-	4.9	3.4	-
N.J. 42	12.6	-	3.5	1.3	7.8
N.J. 44	3.6	-	2.2	1.4	-
N.J. 45	6.5	.6	-	2.3	3.6
N.J. 47	8.8	3.5	2.0	3.1	.2
N.J. 68	8.1	-	8.1	-	-
N.J. 70	58.2	30.7	17.2	6.1	4.2
N.J. 72	28.7	22.5	3.5	2.7	-
N.J. 73	28.3	9.2	11.3	1.6	6.2
N.J. 88	7.3	-	-	7.1	.2
U.S. 130	31.0	-	4.8	5.6	20.6
N.J. 151	.6	-	-	-	.6
N.J. 154	1.7	1.7	-	-	-
N.J. 166	3.8	-	1.6	1.1	1.1
N.J. 167	2.4	2.4	-	-	-

TABLE III (Cont'd.)

Route	Total Miles	Green	Blue	Amber	Red
N.J. 168	10.5	-	4.4	3.1	3.0
N.J. 170	.9	-	.9	-	-
N.J. 180	3.1	-	1.7	1.4	-
U.S. 206	35.6	24.2	6.4	5.0	-
Total	376.5	131.4	92.7	75.4	77.0
%		34.9%	24.6%	20.0%	20.5%

Corridor


HUNTERDON
SOMERSET
MERCER
MIDDLESEX
MONMOUTH
FRENCHTOWN
FLEMINGTON
MATAWAN
LIMITS
LAKEWOOD
LIMITS
CORRIDOR
LEGEND
GREEN
BLUE
AMBER
RED
NOT UNDER STUDY

Fig 4

3. "CORRIDOR"

The "Corridor" sector (figure 4) is located in the central part of the State, directly between the New York Metropolitan area and the Philadelphia/Camden area. The sector accomplishes exactly what its name implies by serving as a corridor for the traffic moving to and from New York and the "Heart of the Megalopolis" and Philadelphia and the western section of the "City to Sea" sector. The New Jersey Turnpike, Routes U. S. 1, U. S. 130 and U. S. 206 serve as principle links between these two urban areas.

The "Corridor" sector is the third largest sector in the State with approximately 1,700 square miles, but it contains the highest total mileage (517 miles) and the highest number of State controlled highways (36) within the sector boundaries, (Table IV). This is with only one urban center, Trenton, having a population greater than 100,000 people located within the sector. It was initially assumed that the geographical location of the "Corridor" sector would not influence the classifications as it did in the first two sectors discussed. It was later found that similar circumstances did exist which resulted in an unacceptable classification of 75% of the highway mileage.

The "Corridor" sector does in fact function as a corridor for traffic moving from the New York area to the Philadelphia/Camden area. The New Jersey Turnpike, one of the heaviest traveled toll roads in the world, carries about 66% of the traffic moving between these two urban centers. The other third is divided among three State controlled highways running parallel to the turnpike.

U. S. 1 - U. S. 1 crosses the Delaware River at Trenton and continues through the State Capital as a limited access freeway. North of Trenton, from Lawrence Township to New Brunswick, U. S. 1 becomes a very wide, straight 4-lane highway with 12-foot shoulders. Every physical characteristic is present for a bikeway, but the high volume of traffic using U. S. 1 creates a question of safety, and therefore an amber classification. North of New Brunswick, U. S. 1 (U. S. 1 & 9 north of Woodbridge) is classified red because of the very high traffic volumes and lack of a safe place to ride.

U. S. 130 - U. S. 130, lying between the turnpike and U. S. 1, is not quite so heavily traveled, but poor shoulder conditions result in an amber classification. In the event of shoulder and roadway improvements, the traffic volumes would sufficiently increase to cancel any upgrading of the classification.

N. J. 27 - N. J. 27 begins at U. S. 206 and proceeds north through the rural areas between Princeton and New Brunswick. Since traffic volumes are low, any classifications given to N. J. 27 result from physical characteristics, wide shoulders, narrow shoulders, curbing, etc. North of New Brunswick, the high traffic volumes and curb parking necessitate a red classification.

N. J. 33 - N. J. 33 does not serve as a connector between the two major urban centers, rather it functions as a connector between Trenton and U. S. 130. It was classified amber due to lack of or poor shoulder conditions, numerous businesses lining the right of way and fairly high traffic volumes.

U. S. 206 - U. S. 206 south of Trenton (South Broad Street) is classified red because of very high traffic volumes, no shoulders and curb parking along much of its length. South of the White Horse Circle, U. S. 206 has 12-foot, paved shoulders, but traffic volumes are too high to permit a higher classification than amber.

N. J. 26, N. J. 91, N. J. 171 - These three State highways pass through the industrial park and suburban areas of south New Brunswick. Though moderately traveled, they are all classified unacceptable because of the poor shoulder conditions.

N. J. 32 - N. J. 32 is a lightly traveled connector between U. S. 130 and Exit 8A of the New Jersey Turnpike. Its wide shoulders permit the acceptable classification.

In the eastern part of the sector, there are ten State controlled highways, excluding the Garden State Parkway, that carry traffic through the "Corridor." Of these ten, six run in a north-south direction, connecting the metropolitan area with the resort areas located

along the coast.

U. S. 9 - The two lane section of U. S. 9 between Lakewood and Freehold is classified amber because of fair to poor shoulder conditions and high traffic volumes. North of the circle in Freehold to N. J. 18, high traffic volumes and numerous businesses lining the right of way make it necessary for an amber classification, regardless of the wide, well-paved shoulders. The remainder of U. S. 9 north to U. S. 1, is classified unacceptable because of the poor shoulder condition, a five mile portion under construction, and the fact that the traffic volumes on this stretch of U. S. 9 are very heavy.

N. J. 34 - N. J. 34, beginning at the N. J. 34/N. J. 35/ N. J. 70 circle near Brielle, traverses the rural areas of Monmouth County. Its acceptable classification results from the 8-foot paved shoulders and light traffic. The northern portions near Matawan are classified amber and red for the opposite reasons: narrow or poor shoulder and increased traffic volumes.

N. J. 35 - N. J. 35 is classified unacceptable from the resort town of Belmar north to Rahway. Narrow or nonexistant shoulders, curbing and very heavy seasonal traffic volumes create red and amber classifications. A five mile section between Pt. Pleasant and Belmar is classified acceptable because of the presence of a good shoulder and moderate

traffic volumes.

N. J. 36 - N. J. 36 is considered unacceptable in the southern portion from Eatontown to Long Branch. It is a wide divided highway with well paved shoulders, but the traffic going to Monmouth Park near Eatontown, located on N. J. 36 in Long Branch, often uses the shoulder as a third lane. North of Long Branch to Sandy Hook State Park, N. J. 36 is narrow and lacks the minimum width for an acceptable bikeway. West of Sandy Hook, N. J. 36 is found to be presently acceptable, but any increase in volume would change the classification to unacceptable.

N. J. 71 - N. J. 71 is very similar to N. J. 35 in that they pass through the same suburban towns and have similar physical characteristics (narrow or nonexistant shoulders and curbing), but the traffic volumes of N. J. 71 are approximately half those of N. J. 35. Regardless of different traffic volumes, most of N. J. 71 is classified unacceptable, except for a short portion near Monmouth College.

N. J. 18 - N. J. 18 is a very heavily traveled highway from New Brunswick, past Interchange 9 of the New Jersey Turnpike to U. S. 9. Curbing and lack of shoulders, coupled with high traffic volumes, create a red classification in the New Brunswick and South River area. A short section of N. J. 18 near U. S. 9 has a wide, well paved shoulder, but the high volume of traffic on this section does not allow an acceptable classification. The completion of N. J. 18 Freeway will initially relieve seasonal traffic volumes on U. S. 9, N. J. 34 and N. J. 35, but the decrease will not be sufficient to warrant a change in classification on any of these three State highways.

Connecting the above mentioned six highways are four State highways, two of which are less than four miles in length.

N. J. 33 - N. J. 33 is classified amber from U. S. 130 to the New Jersey Turnpike because it passes through the center of Hightstown and possesses narrow shoulders. From Hightstown to Freehold, N. J. 33 is classified green because of its wide well paved shoulders and low traffic volumes. East of Freehold, N. J. 33 is classified mostly unacceptable because of an increase in traffic volumes, poor or nonexistant shoulders, and numerous businesses lining the right of way.

N. J. 79 - N. J. 79 is a very lightly traveled highway between Freehold and Matawan. The classifications of blue and amber result from the physical condition of the shoulders, rather than the traffic volume recorded on the road.

N. J. 38 - N. J. 38 has a paved shoulder and very little of anything along its right of way, but its seasonal traffic volumes cause only a blue classification. Since I-195 is designed to end at the N. J. 34/N. J. 38 intersection, N. J. 38 should be reclassified as unacceptable upon the completion of this proposed interstate.

N. J. 66 - N. J. 66 is very similar to N. J. 38 in that it is lightly traveled and possesses a well paved shoulder, resulting in the acceptable classification.

The western portion of the sector continues to function as a corridor for north-south and east-west traffic. There are only seven State highways located in this rural area, most of which function as links between the outer areas of the "Corridor" sector and the urban/corridor area.

N. J. 31 - N. J. 31 is a 4 lane, shoulderless road from Trenton to the Pennington Circle. North of the circle to U. S. 202, N. J. 31 is a moderately traveled, 2 lane road, but the shoulders are in fair to poor condition, resulting in an amber classification. Running coincident with U. S. 202, N. J. 31 is next classified blue because of 12-foot, paved shoulder and moderate traffic volumes. North of Flemington, it was classified amber due to the very poor shoulder conditions. The Master Plan calls for dualization of the two portions of N. J. 31 classified amber. This improvement could increase the classification to blue, providing the volume does not increase too greatly.

U. S. 202 - U. S. 202 in the vicinity of Lambertville is classified red because of the lack of shoulders, regardless of low traffic volumes present. Where it is coincident with N. J. 31, U. S. 202 is classified blue because of wide, well paved shoulders and moderate traffic volumes. East of Flemington to the Somerville Circle, U. S. 202 was classified green because of very wide shoulders and low traffic volumes. The area in and around the Somerville Circle and U. S. 202/ U. S. 206/U. S. 22 Interchange should be avoided because of the lack of shoulder area and very high traffic volumes. North of the circle, much of the northbound traffic is diverted by I-287, therefore, allowing U. S. 202/U. S. 206 to possess an acceptable classification.

N. J. 29 - N. J. 29 is a limited access freeway from the area of the capital complex north to the city limits. A two mile section between Trenton and I-95 is classified acceptable because of wide, well paved shoulders, moderate traffic volumes and almost total absence of cross traffic. Past I-95, N. J. 29 reduces to a narrow, two lane shoulderless road, winding its way along the Delaware River through Washington Crossing State Park and Lambertville to Stockton. The above physical restrictions create the red classification, regardless of moderate to low traffic volumes on this portion of N. J. 29. North of Stockton, the road becomes wider, straighter and even more lightly traveled, thus allowing a blue classification, regardless of the poor shoulders.

N. J. 12 - N. J. 12 is classified mostly acceptable from Frenchtown to Flemington. Since the low traffic volumes do not affect the classification, the physical characteristics are the determining factors. Wide, well paved shoulders create the green and blue classifications while very narrow shoulders create the amber classification.

U. S. 206 - U. S. 206 is classified unacceptable from Trenton north to Somerville. Although it is lightly traveled and passes through the rural areas of Mercer and Somerset Counties, much of U. S. 206 is in poor condition, especially for bikeways. The area from Trenton to Princeton is narrow, with little or no shoulder. In and around Princeton, much of U. S. 206 is curbed or possesses no shoulder. From Princeton to Somerville, there is an 8-foot shoulder, but most of it is in very poor condition. The 1972 Master Plan calls for dualization of U. S. 206 from just north of Princeton to Somerville. If it is improved, the classification of U. S. 206 will also improve, providing the volume does not increase by more than 50%.

N. J. 28 - N. J. 28 is also classified unacceptable, however the portion in Plainfield is not under the Department's jurisdiction, and therefore not classified. West of Plainfield, N. J. 28 is classified red due to lack of shoulders, numerous businesses lining the right of way, and fairly high traffic volumes. A similar condition exists in Somerville, with the addition of curb parking along West Main Street (N. J. 28).

U. S. 22 - U. S. 22 is totally unacceptable from the sector border near Plainfield to Somerville. The portions classified red are through built-up areas with very high traffic volumes. The portions classified amber also have high traffic volumes, but they are through less congested areas where the shoulder is in decent condition. Most of the east/west through traffic is diverted to I-78, near Somerville, thus permitting acceptable classifications on U. S. 22 from this point west to the sector limits. Since traffic volumes are low and U. S. 22 possesses a minimum 8-foot shoulder, any acceptability is dependent upon the physical condition of the shoulder.

N. J. 156, N. J. 160, N. J. 175, N. J. 179 - These four short State highways are portions of other State highways that have been relocated. N. J. 156, N. J. 160, N. J. 175 and N. J. 179 were formerly U. S. 130 in Hamilton Township, U. S. 206 in Bordentown, N. J. 29 in West Trenton and N. J. 31 in Ringoes, respectively. Since traffic volumes are very low, their classifications are dependent upon the physical characteristics.

N. J. 59, N. J. 64, N. J. 177 - These three highways, none of which is longer than .2 miles, were classified by physical characteristics as no volumes were available.

N. J. 172 - N. J. 172 is a local street near Rutgers in New Brunswick. It is narrow with curbs, automatically classified unacceptable.

N. J. 174 - N. J. 174 is presently a spur from U. S. 1 Freeway in Trenton to Whitehead Road. It has the same characteristics as U. S. 1, therefore a red classification.

N. J. 444 - N. J. 444 is a portion of the Garden State Parkway in Middlesex County under New Jersey Department of Transportation's jurisdiction.

Of the 36 State highways located within the confines of the "Corridor" sector, at least ten could be considered major links between the New York Metropolitan area and the Philadelphia area or the shore resort area. Many of the State highways that could be utilized as Class III bikeways are classified unacceptable because of the safety question due to high traffic volumes. Any highways classified acceptable are mostly found away from the main corridors of travel.

TABLE IV

HIGHWAY CLASSIFICATION BY TOTAL MILES

CORRIDOR

Route	Total Miles	Green	Blue	Amber	Red
U.S. 1	41.6	-	-	22.0	19.6
U.S. 9	35.1	-	-	23.5	11.6
N.J. 12	10.7	4.5	2.2	2.4	1.6
N.J. 18	18.4	-	-	5.3	13.1
U.S. 22	27.2	-	8.8	10.8	7.6
N.J. 26	2.1	-	-	1.2	.9
N.J. 27	32.8	4.3	4.4	3.5	20.6
N.J. 28	16.5	-	2.1	6.8	7.6
N.J. 29	31.2	-	13.4	1.0	16.8
N.J. 31	25.2	-	1.2	18.8	5.2
N.J. 32	1.3	-	1.1	.2	-
N.J. 33	36.4	11.2	1.6	16.2	7.4
N.J. 34	25.7	-	16.3	6.8	2.6
N.J. 35	42.2	-	5.2	12.8	24.2
N.J. 36	21.0	-	10.2	9.1	1.7
N.J. 38	3.3	-	3.3	-	-
N.J. 59	.1	-	-	-	.1
N.J. 64	.3	-	-	.3	-
N.J. 66	3.7	2.5	1.2	-	-
N.J. 70	1.4	1.1	-	.3	-
N.J. 71	16.5	-	3.6	8.8	4.1

TABLE IV (Cont'd.)

Route	Total Miles	Green	Blue	Amber	Red
N.J. 79	12.1	-	4.8	7.3	-
N.J. 88	2.5	-	-	1.0	1.5
N.J. 91	2.3	-	-	2.3	-
N.J. 130	27.7	-	-	26.8	.9
N.J. 156	1.2	-	1.2	-	-
N.J. 160	.5	-	.5	-	-
N.J. 171	1.0	-	-	-	1.0
N.J. 172	.8	-	-	-	.8
N.J. 174	.8	-	-	-	.8
N.J. 175	1.2	-	-	1.2	-
N.J. 177	.2	-	-	.2	-
N.J. 179	1.8	-	-	1.8	-
U.S. 202	31.5	14.9	9.0	3.8	3.8
U.S. 206	31.5	-	-	18.9	12.6
N.J. 444	8.9	-	-	-	8.9
Total	516.7	38.5	90.1	213.1	175.0
%		7.5%	17.4%	41.2%	33.9%

Southern Plains


SOUTHERN PLAINS
LEGEND
GREEN
BLUE
AMBER
RED
NOT UNDER STUDY
N
DELAWARE RIVER
PENNS GROVE
NEW JERSEY
TPK
ATLANTIC
SECTOR LIMITS
CITY EXPRESSWAY
GLOUCESTER
SALEM
SALEM
VINELAND
EGG HARBOR
BRIDGETON
MILLVILLE
CUMBERLAND
ABSECON
ATLANTIC CITY
ATLANTIC
TUCKAHOE
OCEAN CITY
CAPE MAY
STATE PARKWAY
DELAWARE BAY
ATLANTIC OCEAN

Fig. 5

4. "SOUTHERN PLAINS"

The "Southern Plains" sector (figure 5) is located in the southernmost portion of the State. It is the largest of the five sectors, containing approximately 2,030 square miles. There are only two built-up areas in the sector with more than 50,000 people, the Vineland/Millville and Atlantic City areas. The remainder of the sector is occupied by farms and wooded areas.

The "Southern Plains" contain the second highest total mileage of the five sectors (Table V). Eighty-one percent of the 443 miles are classified acceptable, mainly because of the low traffic volumes on most of the highways. The Atlantic City Expressway and Garden State Parkway have greatly reduced the high summer traffic on many State highways from the Philadelphia/Camden area and U. S. 9 from North Jersey.

U. S. 9 - U. S. 9 possesses all four classifications along its 50 mile length from Cape May to the Mullica River. Since the Garden State Parkway runs adjacent to U. S. 9,, traffic volumes are very low compared to the Parkway. The southern portion of U. S. 9, from Cape May to Ocean City, is classified acceptable because of good shoulders and low traffic volumes. North of Ocean City, U. S. 9 has a narrower shoulder and it passes through built-up areas around Atlantic City, thus an amber classification. From Atlantic City to the sector limit, it is classified acceptable because of wider shoulders and the lightly populated area it passes through.

U. S. 30 - U. S. 30 (White Horse Pike) in the "Southern Plains" sector is a continuation of U. S. 30 from the "City to Sea" sector to Atlantic City with a narrow 2-3 foot shoulder much of its length, below the requirements for an acceptable classification. Two sections totaling three miles, a portion in Egg Harbor and one in Atlantic City, are classified red because of the absence of a shoulder and the presence of a curb. A short section north of Egg Harbor is classified green because of wide, well paved shoulders. Another section, between U. S. 9 and Atlantic City, has a 10-foot, paved shoulder, but potential seasonal traffic volumes do not permit anything higher than a blue classification. If traffic volumes on this section of U. S. 30 increase too greatly, an amber classification is required.

U. S. 40 - U. S. 40, classified mostly green and blue from the Delaware Memorial Bridge, through rural or lightly populated areas to Pleasantville, is a wide, well paved two lane road with well-paved shoulders. Where U. S. 40 and U. S. 322 are coincident, the road has four lanes and is divided, again with good shoulders. Just west of the Garden State Parkway in Pleasantville, the number of businesses, gas stations, shopping centers, etc., increase greatly. These typical traffic generators caused an unacceptable classification from this point into Atlantic City.

N. J. 44 - N. J. 44 is a two lane road, continuing south from the "City to Sea" sector. It is classified acceptable because it passes through the rural areas south of Paulsboro and because of low traffic volumes.

N. J. 45 - N. J. 45 is classified acceptable from the sector limits to Salem because of good shoulder conditions and low traffic volumes.

N. J. 47 (Delsea Drive) - N. J. 47, the longest road in the sector, is classified acceptable on 92% of its total mileage. It has wide shoulders in good condition with only farms lining much of its right of way. The unacceptable mileage is found on three short portions, one in Vineland, one in Millville and one in Wildwood. In each case, the roadway lacks sufficient shoulder area or is curbed, resulting in a red classification.

N. J. 48, 49, 50, 54, 77, 83 - These six State highways, each one located entirely within the sector limits, have almost 90% of their total mileage classified acceptable. All pass through rural and wooded areas of South Jersey, and all possess at least rideable shoulders.

N. J. 55 - N. J. 55 is a limited access freeway around Millville, forcing the red classification. It is presently under construction from U. S. 40 to N. J. 47 in Millville. Upon its completion, it will parallel N. J. 47 from N. J. 42 south to U. S. 9.

U. S. 130 - U. S. 130 passes into the "Southern Plains" sector coincident with I-295, but branches off to the west near the Chester-Bridgeport Bridge. Wide shoulders and the rural areas through which U. S. 130 passes result in a green classification. The classification changes to blue in Penns Grove because there is some parking along the road in the suburban community.

U. S. 322 - U. S. 322, from the Delaware River east to where it intersects with N. J. 42, is classified blue, but any increase in traffic will change it to amber. It is fairly narrow with only 5 to 6 foot shoulders, while some places the shoulder is even narrower. Since this portion of U. S. 322 passes through a rural area, traffic volumes are the determining factor. From the U. S. 322/N. J. 42 intersection south to U. S. 40, U. S. 322 (Black Horse Pike) is a very wide, four lane highway with 12-foot, paved shoulders. Traffic volumes on the Black Horse Pike are highly seasonal, mainly on Friday and Sunday nights between the months of May and September.

N. J. 52, N. J. 87, N. J. 147, N. J. 152 - Each one of these State highways serves as a link between the mainland and one of the numerous shore resort areas. N. J. 52 and N. J. 87 are both less than three miles long and lack sufficient shoulder area upon which to safely cycle, thus the unacceptable classification. Conversely, N. J. 147 and N. J. 152 are both a little over three miles long and possess adequate shoulders for cycling. They possess fairly high traffic volumes during the weekends in the summer.

N. J. 157 - N. J. 157 is a 1.0 mile local street in Absecon. Although it is lightly traveled, it lacks a shoulder area upon which to safely ride, thus the amber classification.

N. J. 444 - N. J. 444 is a portion of the Garden State Parkway in Cape May County under New Jersey Department of Transportation jurisdiction.

The analysis of the "Southern Plains" sector reveals certain interesting points. Of the 84 miles of highways classified unacceptable, more than 50 of those miles are found on only four State highways, leaving 34 miles of unacceptable miles to be divided among the remaining 18 highways. Most of the unacceptable mileage is found at the busy intersections of each State highway, where the towns usually locate their business districts, as in Salem, Millville, Bridgeton, Woodstown and Glassboro.

A second point is the very low traffic volumes found on most of the highways, especially in the central and western areas of the sector. The low volumes permit acceptable classifications even where the shoulder widths are barely acceptable. Traffic volumes in the northern and eastern areas are slightly higher, but this is due to seasonal traffic generated by the shore resort areas. The classification of U. S. 30 and U. S. 9 around Atlantic City reflect this concept.

TABLE V

HIGHWAY CLASSIFICATION BY TOTAL MILES

SOUTHERN PLAINS

Route	Total Miles	Green	Blue	Amber	Red
U. S. 9	49.7	18.9	19.6	8.6	2.6
U. S. 30	28.6	3.9	4.6	17.1	3.0
U. S. 40	62.2	33.2	18.2	9.1	1.7
N. J. 42	1.5	-	1.5	-	-
N. J. 44	6.2	1.2	4.4	.6	-
N. J. 45	21.0	11.7	7.4	1.9	-
N. J. 47	64.8	30.0	29.7	1.7	3.4
N. J. 48	4.3	3.8	-	.5	-
N. J. 49	53.7	31.3	15.6	5.8	1.0
N. J. 50	25.5	22.6	2.6	.3	-
N. J. 52	2.7	-	-	.5	2.2
N. J. 54	11.9	7.9	1.6	2.4	-
N. J. 55	7.9	-	-	-	7.9
N. J. 77	22.6	18.5	1.4	.6	2.1
N. J. 83	3.9	-	3.9	-	-
N. J. 87	1.4	-	.5	.9	-
U. S. 130	14.0	11.0	3.0	-	-
N. J. 147	3.2	-	3.2	-	-
N. J. 152	3.2	-	3.0	.2	-
N. J. 157	.9	-	-	.9	-

TABLE V (Cont'd.)

Route	Total Miles	Green	Blue	Amber	Red
U. S. 322	49.5	20.8	23.4	5.3	-
N. J. 444	4.2	-	-	-	4.2
Total	442.9	214.8	143.6	56.4	28.1
%	23.6%	48.5%	32.5%	12.7%	6.3%

Hills and Lakes


HILLS & LAKES
LEGEND
GREEN
BLUE
AMBER
RED
NOT UNDER STUDY
NEW YORK
SUSSEX
WARREN
MORRIS
HUNTERDON
HACKETTSTOWN
WASHINGTON
PHILLIPSBURG
LIMITS
LIMITS

Fig. 6

5. "HILLS AND LAKES"

The "Hills and Lakes" sector (figure 6) is located in the northwestern corner of the State, away from any major urban center. There are three urbanized areas in this sector, but none have a population greater than 30,000 people. In each case, these three areas are surrounded by the mountains and woodlands typical to this sector.

The "Hills and Lakes" sector contains almost 311 miles (Table VI) of State highways, fourth highest of the five sectors. Over 75% of the mileage in the sector is classified unacceptable, due mainly to the mountainous terrain through which many of the State highways pass. These State highways are narrow and usually lack shoulder area. In some cases, physical restrictions exist, but very low traffic volumes permit an acceptable classification.

U. S. 46 - A majority of U. S. 46, approximately 33 miles of its entire length, is classified unacceptable because of a various combination of reasons: The eastern portion has well paved shoulders, but very high volumes and numerous business concerns lining the right of way; in the vicinity of Denville, much of the traffic is diverted to I-80, but the physical characteristics of U. S. 46 change to narrow or bad shoulders, and in some places, no shoulder at all; west of the U. S. 46/N. J. 10 circle, traffic volumes increase and shoulder condition is very poor; U. S. 46 between Netcong and Hackettstown has moderate traffic volumes, but no shoulder; east of

Hackettstown, traffic volumes decrease greatly, but the shoulder is only 4-feet wide; further west, U. S. 46 has been repaved, and the shoulders are 8-feet wide, sufficient for a blue classification. The blue classification exists to the I-80/U. S. 46/N. J. 94 Interchange, except for a short 1.5 mile section classified amber because of the presence of curbing. Any increase in traffic volumes from Hackettstown to the I-80/U. S. 46 Interchange will necessitate an amber classification through this section.

N. J. 10 - N. J. 10 is classified amber over the entire length located in the "Hills and Lakes" sector. It has well paved shoulders, but traffic volumes on N. J. 10 are very high, especially in the eastern portion. There are numerous businesses lining the right of way, including at least three major shopping centers.

N. J. 57 - The classification of N. J. 57 is based entirely on physical considerations. The volume is moderate between Phillipsburg and Washington, but it decreases greatly east of Washington to Hackettstown. N. J. 57, repaved along much of its length between Phillipsburg and Washington, has shoulders that vary in width from 4 to 10 feet. Since most of N. J. 57 possesses shoulders 8 to 10 feet wide, the shorter, narrower sections were also classified acceptable to maintain consistency. Any traffic volume increase would change the classification to amber.

East of Washington, the shoulder varies from very poor to very good condition, thus the frequent changes in the classification.

U. S. 22 - Much of U. S. 22 is coincident with I-78 from the sector limits to the Phillipsburg area, thus automatically eliminating it from consideration. A short four mile section from the end of I-78 to the Phillipsburg-Easton Toll Bridge is classified red because it is heavily traveled, lacks shoulders, and is curbed in numerous places.

U. S. 22A - U. S. 22 alternate is a minor arterial from U. S. 22 to the Phillipsburg city limits. It is classified amber because of the very narrow shoulders and moderate traffic volumes.

N. J. 173 - N. J. 173, old U. S. 22, is very lightly traveled throughout its entire length, therefore, the classification is dependent upon the shoulder condition. The eastern portion possesses an 8-foot, paved shoulder, and a blue classification. The western portion has an 8-foot shoulder also, but in a high state of disrepair, thus the amber classification.

N. J. 31 - N. J. 31 continues north from the sector limits with the same characteristics that caused the unacceptable classification in the "Corridor" sector. N. J. 31 is a narrow, two lane road with very poor shoulders of gravel or broken bituminous concrete. Some sections have been repaved, but the shoulders are still too narrow to accommodate bike traffic safely.

U. S. 206 - U. S. 206, the longest State highway in the sector, is very similar to N. J. 57. Since traffic volumes fluctuate between low and moderate, the classifications are dependent upon the conditions and width of the shoulders, which also fluctuate between excellent and poor. Much of the 16 miles of U. S. 206 between U. S. 202 and I-80 in Netcong has been repaved, thus giving it an acceptable classification. An unacceptable portion in Morris County was not repaved, therefore, the amber classification. North of Netcong to Newton, much of the road was also repaved, but certain conditions create a question of safety. In some areas, the road or shoulder was not repaved, in others, it was narrow and used as a climbing lane for trucks. In Newton, U. S. 206 is curbed with frequent curb parking. North of Newton to the Delaware River, the classification varies from amber to green, primarily due to the condition and width of shoulder.

N. J. 183 - All through traffic on N. J. 183, old U. S. 206 through Netcong, is diverted around Netcong by I-80/U. S. 206, therefore, leaving only local traffic on N. J. 183. A short portion is classified red because of the poor shoulder and businesses lining the right of way. The other section is acceptable because of the light traffic and a very wide roadway.

U. S. 202 - U. S. 202 is totally unacceptable from the sector limits to U. S. 202/N. J. 53 Intersection where the State's jurisdiction ends. It is a very narrow, shoulderless highway that winds its way between Somerville and Morristown, with no place to safely ride a bicycle.

N. J. 24 - N. J. 24 is classified mostly amber from the sector limits to Morristown because of poor shoulder conditions along most of its length. Traffic volumes near Fairleigh Dickinson and Drew Universities in Madison and traffic volumes in the vicinity of Morristown also necessitated the unacceptable classification.

N. J. 53 - N. J. 53 has a 6 to 12 foot shoulder along most of its length, but it is an oiled gravel shoulder. This type of shoulder is not adequate for bicycle traffic.

N. J. 15 - N. J. 15 winds its way through very hilly terrain between I-80 and N. J. 94, most of which is classified unacceptable. The southern portion is curbed and no shoulder exists, especially around I-80. North of I-80, N. J. 15 forms a couplet, northbound is a new road while the southbound roadway is old N. J. 15. The northbound lane utilizes the shoulder as a climbing lane in numerous areas, while the southbound has sufficient shoulder. The numerous businesses located on the southbound side and in the couplet necessitate a red classification. The one mile portion classified blue is flat, straight and has a suitable shoulder. The section classified blue ends where the dualization ends, and the construction of N. J. 15 Freeway begins. North of this point to N. J. 94, N. J. 15 is a narrow, shoulderless road weaving in and out of the hilly terrain of Sussex County. The portion classified blue between N. J. 94 and U. S. 206 has recently been repaved with 6-foot shoulders and low traffic volumes.

N. J. 94 - N. J. 94 is very lightly traveled throughout its entire length from the Delaware River to the New York State line. Except for a 5.5 mile section classified blue, N. J. 94 is totally unacceptable because of the narrow roadway and inconsistent conditions of shoulder area through the mountains of Warren and Sussex Counties. The width and condition of the shoulder in unacceptable areas varies from zero to 6-feet while the status of the shoulder is fair to poor condition. Most of the 6-foot shoulders are in disrepair while many of the areas with narrow shoulders, 2 to 3 feet, have been repaved.

N. J. 23 - N. J. 23, is in effect, two highways: The portion in Passaic County is a recently reconstructed, 4-lane highway with 12-foot, paved shoulders while the entire portion in Sussex County is a narrow, winding road with little or no shoulder. Traffic volumes on the dualized portion are such that an acceptable classification is warranted. Similar volumes on the narrow portion in Sussex County resulted in the unacceptable classification. North of N. J. 284 to Port Jervis, the volume drops to a minimal figure, but the physical conditions and mountainous terrain caused a continuation of unacceptability.

N. J. 284 - N. J. 284 is a narrow, secondary highway passing through the hilly terrain of northern Sussex County. Though very lightly traveled, poor shoulders or lack of shoulders makes its use as a bikeway unacceptable.

N. J. 182 - N. J. 182 is a 1.0 mile long road located in Hackettstown. It is unacceptable because of the narrowness of the road and lack of shoulders.

N. J. 163 - N. J. 163 is old U. S. 46. It is only .5 miles in length and closed on one end, making it acceptable, but not functional as a bikeway.

In the analysis of the "Hills and Lakes" sector, certain similarities with the "Southern Plains" sector are discovered. First, both sectors are sparsely populated with no single large concentration of population. They both lie outside the main urban-corridor between New York and its metropolitan area and the Philadelphia/Camden area. Second, the State highways in both sectors have low average annual daily traffic volumes, but relatively higher seasonal volumes. The single condition which creates the opposite classification for the sectors is the geological difference between the two areas. The mountainous areas of the "Hills and Lakes" sector are not conducive to safe, comfortable bicycling, especially on the narrow roads of the sector, no matter how light the traffic.

TABLE VI

HIGHWAY CLASSIFICATION BY TOTAL MILES

HILLS & LAKES

Route	Total Miles	Green	Blue	Amber	Red
N.J. 10	17.4	-	-	17.4	-
N.J. 15	19.6	-	2.7	6.7	10.2
U.S. 22	3.9	-	-	-	3.9
U.S. 22A	1.6	-	-	1.6	-
N.J. 23	37.2	-	11.0	17.7	8.5
N.J. 24	7.4	-	-	5.1	2.3
N.J. 31	17.0	-	-	12.0	5.0
U.S. 46	47.8	-	13.1	6.6	28.1
N.J. 53	4.7	-	-	4.7	-
N.J. 57	20.8	2.9	10.4	6.9	.6
N.J. 94	43.0	-	5.6	18.8	18.6
N.J. 163	.5	-	.5	-	-
N.J. 173	13.3	-	3.3	10.0	-
N.J. 182	1.0	-	-	.5	.5
N.J. 183	2.1	-	1.4	-	.7
U.S. 202	16.5	-	-	-	16.5
U.S. 206	50.0	12.0	14.6	17.5	5.9
N.J. 284	7.0	-	-	-	7.0
Total	310.8	14.9	62.6	125.5	107.8
%	16.6%	4.8%	20.1%	40.4%	34.7%

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